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TAX DEPRECIATION POLICY OPTIONS: MEASURES OF EFFECTIVENESS AND ESTIMATED REVENUE LOSSES

Abstract

This report develops a set of measures of effectiveness of changes in tax depreciation policy as investment incentives and applies them to such commonly proposed changes as: (1) provision of initial allowances; (2) arbitrary shortening of useful lives of assets for tax purposes; (3) allowance of declining balance depreciation methods at three times the straight line rate; and (4) substitution of the full year for half year convention. In addition, consideration is given to the qualitative aspects of abandonment of the reserve ratio test and to disregarding additional amounts of salvage in the determination of allowable depreciation deductions. Estimates of revenue losses associated with a variety of depreciation policy changes are also presented, along with a description of the computer model utilized for their computation.

July 10, 1970

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Appendix A

Appendix B

Part I

Four Measures for Comparing Alternative Depreciation Policies

Tax depreciation policy may be described most succinctly as the set of rules which govern the size of annual depreciation deductions allowed for purposes of computing taxable income. These rules, in general, specify that the aggregate of all depreciation deductions which may be taken by a business taxpayer may not exceed the difference between the original cost, or other basis, of the asset and its salvage value, and that this depreciable basis must be apportioned over the estimated useful life of the asset by a consistent method. 1/

Despite the fact that the aggregate depreciation deductions for any asset may not exceed the depreciable basis and is the same under any method, the timing of the deductions varies under different methods; and since differences in timing of deductions cause differences in timing of tax liabilities, changes in tax depreciation policy have economic consequences. It is generally understood that tax depreciation policies which permit more depreciation deductions

1/ Section 167 (b) of the Internal Revenue Code authorizes these methods: (1) the straight line method, by which the depreciable basis is distributed over the life of an asset in equal periodic amounts; (2) the declining balance method by which the annual depreciation is determined by multiplying the remaining undepreciated balance by a constant rate, which may be no higher than twice the annual straight line rate except in the case of commercial and industrial structures for which the rate may not exceed 1.5 times the straight line rate for new property; (3) the sum-of-the-years digits method, by which the annual depreciation deduction is that portion of the depreciable basis equal to a fraction, the numerator of which is the remaining years of asset life (including the tax year in question) and the denominator of which is the sum of all the years' digits representing the useful life of the asset; and (4) any other consistent method which does not result in an accumulated total of depreciation deductions during the first two-thirds of an asset's life which is greater than that which would have resulted from the double declining balance method. Further exceptions to the use of accelerated methods are provided in the case of used structures: in general used commercial and industrial buildings and used residential structures with a useful life of less than 20 years may be depreciated only by straight line methods while used residential structures with a useful life of 20 years or more may be depreciated by a declining balance method at a rate no higher than 1.25 times the straight line rate.

in early years are "worth more" to a taxpayer because they defer his tax liabilities to later years without penalty of interest charges. In this introductory note, assuming an asset which costs $1,000, has an actual useful life of 12 years, and no net salvage value, we develop four measures by which to evaluate four alternative tax depreciation policies. The period of 12 years has been taken for the illustration because it represents the average useful life for depreciable assets used in manufacturing industries, the sector of the economy which is regarded as being highly sensitive to investment incentives. For purposes of constructing these measures, it will be assumed an after-tax rate of return of 12 percent is representative, since that is the return on equity reported by all manufacturing companies in the SEC-FTC Quarterly Financial Report over the previous three years.

Section A of Table 1 portrays the effect of differences in timing of deductions as among several depreciation methods. Expensing, which is the extreme of "acceleration," allows an immediate write-off of basis; and, with less accelerated methods, the first year deductions range down to $83.33 by the straight line method. By the end of the first half of the asset's life, $500 of deductions would have been taken under the straight line method, but the amount under the sum-of-years digits (SOYD) method would be $730.77.

Considering that, to the taxpayer hypothesized here, each dollar of payment deferral can yield a net return of 12 percent, we may quantify the values of these alternative depreciation policies to the taxpayer as he contemplates the purchase of the $1,000 asset with a 12 year expected life so that they may be compared with each other by discounting each method's depreciation deduction stream to the present at 12 percent. The result is shown in Section B of

Table 1

Comparative Measures of Differences Between Four Depreciation Methods Applied to a $1,000 Asset When the After-Tax Rate of Return is 12 Percent

Item	With income tax @ 48 percent, and allowable tax depreciation			
	Straight line	Double declining balance	Sum-of-years digits	"Expensing"
A. Tax life = expected life = 12 years cumulative depreciation deductions, at end of				
Year 1	$ 83.33	$ 166.67	$ 153.85	$1,000
3	250.00	421.30	423.08	1,000
6	500.00	665.10	730.77	1,000
12	1,000.00	1,000.00	1,000.00	1,000
B. Present value of depreciation deductions at beginning of year 1	$ 516.20	$599.01	$620.26	$1,000 1/
Equivalent present value of reduction in tax liabilities	247.78	287.52	297.72	480.00 1/
Excess over straight line depreciation	--	39.74	49.94	232.22
C. Asset price reduction which would be equivalent to tax depreciation more accelerated than straight line	--	$52.85	$66.40	$308.72
D. Effective tax rate, straight line depreciation as standard	48%	43.3%	42.0%	0
E. Effective rate of return, straight line depreciation as standard	12%	13.1%	13.4%	23.1%

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1/ If it is recognized that tax deductions cannot be effectively taken until tax liabilities are accrued and payable, the present value of the deductions would be $944.91, and the present value of the reduction in taxes would be $453.56.

Table 1. Obviously expensing, which has the quickest write-off has the highest present value, shown as $1,000 in the table; 1/ and straight line depreciation, which has the slowest write-off of the four methods examined, has the lowest present value.

Of course, present values of deductions have no economic content in themselves; they do not directly represent cash payments or receipts. However, under an income tax system, they do affect tax liability and, hence, the accrual and payment of taxes. Reflecting an income tax rate of 48 percent, the second row of Section B shows the differential cash flow effect of depreciation policies on the owner of the asset as he considers purchasing it. The interpretation of these numbers is as follows: if the prospective owner of the asset -- who is (1) paying a 48 percent tax and (2) expects a 12 percent return after tax -- presented with the choice of no allowance for tax depreciation deductions or of being accorded the privilege of taking straight line deductions, he would be willing to pay up to $247.78 for the privilege of using the straight line method. Alternatively, if he had been permitted only to take straight line depreciation and were asked how much we would be willing to pay for the privilege of using the double declining balance method, his response would be: "Up to $39.74," which is the excess of the present value of DDB tax reductions (extra cash flow) over straight line. Similarly he would be willing to pay up to $49.94 for the opportunity to use SOYD depreciation rather than straight line and $232.22 to expense rather than be limited to straight line. These differences in the value of tax deferral associated with different tax depreciation policies are one useful economic measure.

1/ For expositional simplicity the entries in the table for expensing neglect the slight discounting necessary to recognize that tax deductions cannot be taken until tax liabilities are accrued and payable. See note 1 to Table 1 for discounted values of full expensing.

Section C presents another series of measures of the economic significance -- incentive effect -- of these depreciation policies. The point of view taken is the following: if, as was basically the case before 1954 when accelerated depreciation methods were authorized by the Internal Revenue Code, we take straight line depreciation as the base from which to measure change, then it can be computed that the benefit from being permitted to use DDB rather than straight line methods is equivalent to a reduction of $52.85 in the price of this $1,000 asset, or a price reduction of 5.3 percent. That is, if the Government had subsidized the sale of this asset to the extent of $52.85 but continued to require the asset owner to use only straight line depreciation (on the diminished basis of $947.15), the asset owner would be as well-off as when he is extended the privilege of using DDB. Or, put another way, the incentive effect of permitting DDB rather than straight line depreciation is equivalent to that which would be produced by a 5.3 percent reduction in the prices of 12 year assets. And, since SOYD depreciation is more accelerated than DDB, a switch to it from straight line is equivalent to a $66.40 reduction in the price of a $1,000 asset, or 6.6 percent.1/ Finally, permission to expense the cost of the asset rather than take straight line depreciation would be equivalent to a $308.72 reduction in price, nearly 31 percent, a powerful incentive indeed.

1/ There are combinations of circumstances not infrequently encountered in business investment situations under which the DDB method yields a higher present value of depreciation deductions than does the SOYD method. Since the characteristic time pattern of DDB deductions always includes a higher deduction in the first year (see Table 1), for particular combinations of high discount rates and short lives of assets, the DDB method is more beneficial to taxpayers than the SOYD method. More importantly, if salvage value is a significant proportion (15 percent or more, in the cases of assets with tax lives of 10 years or more) of the acquisition cost, or other basis, of the asset, the DDB method is generally more favorable, since the declining balance rate may continue to be applied until the undepreciated balance of the asset equals salvage value: the higher the salvage value, the more quickly will a DDB rate write-off the depreciable basis of the asset. In contrast, either the straight line or SOYD method will distribute the depreciable basis over the entire useful life of the asset.

The same data may also be used to measure the tax depreciation policy differentials as differences in effective tax rates, as is shown in Section D of Table 1. Clearly, if more accelerated depreciation is worth more to the owner of a depreciable asset than less accelerated depreciation, this increased benefit may also be equated to a lower rate of taxation while holding the depreciation method constant. As indicated in Table 1, if straight line depreciation is taken as the basis of comparison, and the nominal tax rate is 48 percent, permitting DDB is equivalent, from the point of view of the owner of the asset, to a reduction in the tax rate to 43.3 percent. That is, in lieu of permitting the use of DDB, a reduction in the tax rate from 48 to 43.3 percent (and still requiring straight line depreciation) would leave the asset owner equally well-off. And, since the difference between straight line and DDB depreciation policies is equal to an asset cost reduction of 5.3 percent (see Section C of Table 1) we may observe that a reduction in the tax rate from 48 to 43.3 percent has the effect of reducing the cost of 12 year assets by 5.3 percent. It is in this sense that a tax rate reduction is also an investment incentive. Again, since SOYD depreciation deductions are worth more than DDB, permitting a switch from straight line to SOYD reduces the effective tax rate to 42 percent. Finally, permitting the capital cost of an asset to be expensed has the effect of exempting the income from ownership of the asset from taxation.1/

A fourth measure of the differential economic impact of tax depreciation methods, also based on the data of Section B in Table 1, is expressed in terms

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1/ An intuitive explanation of this somewhat surprising result takes the following form: a $1,000 asset will generate some stream of revenues over its life; if the cost is expensed and the tax rate is 48 percent, the net cost of the asset to the owner (ignoring the slight discount of the deduction as above) is only $520, after tax. However, in the future, each $1 of revenue will be taxed fully, with no allowance for depreciation, leaving $0.52 of net return on the $520 investment, the same ratio as $1 to $1,000 as if there were no tax. Incidentally, in those cases, as in minerals taxation, where the total present value of expensing and depletion deductions may actually exceed the cost of the investment, the effective tax rate is negative. That is, in some instances the tax rate equivalent of an investment tax incentive is a tax rate less than zero.

of rates of return from the ownership of depreciable assets. Once again, taking the straight line depreciation case as a standard of comparison, if the rate of return after taxes at a 48 percent tax rate is 12 percent, the benefit of permitting DDB tax depreciation is equivalent to raising the rate of return to 13.1 percent, an increase of 1.1 points, or more than 9 percent in after tax rate of return; permitting SOYD is equivalent to raising the rate of return to 13.4 percent, an increase of 11.5 percent; and permitting expensing is equivalent to raising the rate of return to 23.1 percent, a 92.5 percent increase in rate of return. 1/ It is worth noting that the increase in rate of investment which might occur in response to the incentives provided by a change in tax depreciation policy, or any other business income tax policy that reduces the weight of taxation on the cost of undertaking investment projects, reflects two distinctive elements. There is, most obviously, an increase in rate of investment due to expansion of kinds of investment which were already profitable enough to be undertaken before the policy change; since these are now more profitable, more will be undertaken. Additionally, many investment projects which were insufficiently profitable before the change now become profitable. In the example above, for 48 percent taxpayers, projects with a useful life of 12 years, which could only yield after tax rates of return of 10.6 percent when tax depreciation is limited to straight line and hence could not be undertaken because the going rate of return in the market is 12 percent, become eligible for investment if tax depreciation is allowed to be computed by the SOYD method. With no change in the market prices of products or depreciable assets, this degree of liberalization of depreciation would raise the after tax rate of return of such projects to 12 percent and qualify them to be undertaken.

1/ Twenty-three and one-tenth percent is also the pre-tax rate of return which yields the after-tax rate of 12 percent used above in discounting cash flows. Since the effective tax rate in the case of expensing is zero. the pre- and after-tax rates of return are equal.

Of course, the extent to which the rate of investment may be expanded for both these reasons is dependent on the expansibility of the supply of savings (capital funds). If desired expansion in the rate of investment does not elicit an increased flow of savings, interest rates (the rates used in discounting future payments) will be pushed upward, and this will dampen the rate of investment undertaken.

The above may be summarized in the following way: In 1954 when tax depreciation was liberalized by making freely available to taxpayers the use of SOYD depreciation, if 12 year assets may be taken as typical of manufacturing machinery and equipment, and a 12 percent after-tax rate of return is descriptive of the opportunity cost of capital, the option to switch from straight line depreciation to SOYD may be evaluated, reading down the column headed SOYD in Table 1, as worth:

a. $49.94 per $1,000 of net assets, in terms of greater cash flow from tax deferral, or

b. The equivalent of a 6.6 percent reduction in the cost of new assets, or

c. A reduction in the effective tax rate from 48 to 42 percent, or

d. An increase in the rate of return from ownership of assets from 12 to 13.4 percent.

Since all these measures are derived from the same data -- the differences in present value of varying degrees of tax deferral provided by optional tax depreciation policies -- they are equivalents: The greater degree of tax deferral under SOYD as compared with straight line depreciation for a $1,000 asset with a 12 year life is equal to a present value in cash of $49.94, which is the same as a 6.6 percent reduction in the price of the assets, or a reduction in the tax rate from 48 to 42 percent, or to an increase in after-tax profitability from 12 to 13.4 percent. Depending on the way particular investors

may prefer to assess the effect of a change in income tax policy, any of these measures will suffice to index the "incentive" effect of a change. The response to these incentives, however, will obviously not be uniform over all industries. Depreciable assets are only one input to production processes, and the relative importance of this form of capital varies greatly from industry to industry. In some industries, such as primary metals, chemicals, and heavy manufacturing, depreciable assets contribute five times as much to unit product costs as in others, such as textiles; a 6 percent reduction in the cost of depreciable assets will clearly elicit much more response in the former category of industrial enterprises than in the latter.

In Part II, several changes in tax depreciation policy are examined. To the extent each change results in a determinate modification of the time stream of depreciation deductions, the change is evaluated by at least one of the measures developed above. That is, given the present law provisions (including accelerated depreciation), the value of a proposed change -- substituting a first year allowance, allowing triple declining balance depreciation, etc. -- is measured as an asset price reduction equivalent, a change in effective tax rate, or an increase in "rate of profit."

Part II

Tax Depreciation Policy Options

The reasons for modifying the present tax treatment of depreciation range over the entire spectrum of considerations pertinent to tax reform. Since tax depreciation is a major determinant of the effective tax imposed on income from business equity investment, one set of objectives toward which depreciation proposals are aimed is concerned with incentives to investment. This set addresses both generalized concerns that the rate of private investment is inadequate to support a sufficiently high rate of economic growth as well as particular concerns that investment in specific industrial categories is disadvantaged with respect to other categories or to foreign investment. A second set of objectives, not necessarily mutually exclusive of the other, principally addresses basic questions of business income tax structure: the neutrality of present tax depreciation policies with respect to investments in assets of different lives and with respect to the effects of inflation.

A number of proposals to achieve one or more of these objectives is examined in this part. Whenever possible, the investment incentive equivalent of the proposal will be discussed, along with their more important implications for tax system neutrality. No conclusions as to the merits of the options are reached; these can only be arrived at in the context of a budget proposal, including an evaluation of the fiscal impact of particular proposals and the available means for financing them. As an aid to budgetary evaluation, revenue estimates for particular proposals are presented in Part III.

A. Proposals to Liberalize Tax Depreciation, the Incentive Effects of Which Are Not Amenable to Quantification and Tax Revenue Estimation

(1) Abandon the Reserve Ratio Test

When Revenue Procedure 62-21, popularly known as "Guidelines," was published in 1962, two purposes were served. On the one hand, the Guidelines presented a simplified set of asset classes with corresponding asset lives that constituted the first revision of "guideline lives" since these had been incorporated in Bulletin F in 1942. On the other hand, Guidelines formalized the application of the reserve ratio test, a mechanical method by which business taxpayers may establish whether the asset lives they are using for tax purposes are consistent with their useful lives as required by Section 167 (a) of the Internal Revenue Code.1/ The guideline lives published were not only simplified as compared with the extensive listings in Bulletin F, they were also purposely set at levels below typical, or average, replacement periods, as indicated in industry surveys that had been completed for the revision, rather than at industrial averages as had been the case in Bulletin F. The reason for this departure in Guidelines was the desire to facilitate the adoption of faster replacement policies by business taxpayers in harmony with the economic policy objective of the time to modernize United States industrial plant, which was then thought to be obsolescent.

It was not the intent of Guidelines to simply shorten lives for tax purposes for all taxpayers. It was, rather, intended that taxpayers who had adopted, or wished to adopt, investment policies which resulted in below-average replacement periods should not be penalized by the theretofore traditional

1/ For example, if the firm exemplified in Table 1 above were to possess a large number of 12 year assets each being more or less regularly replaced on schedule, the reserve ratio test would compare his accumulated depreciation deductions with the total value of all his assets. The ratio of the accumulated total deductions to total value of assets would be 50 percent, if he uses straight line depreciation, since that is the ratio of the total cumulated depreciation for each of his assets to their total acquisition cost, or basis. Similarly, the ratio would be 59 percent if he uses DDB, and 65 percent if he uses SOYD. Ratios are presented in Guidelines which also account for growth and allow for variances in retirement dates.

tax audit procedure which placed the burden of proof on the taxpayer for "justifying" departures from Bulletin F lives. Thus, the new published guidelines were "short" for the bulk of business taxpayers, but they were admonished that, if they were to use these lives, or any other which might be shorter or longer, they would have to satisfy the reserve ratio test. In order to facilitate changes in investment policy which taxpayers might be induced to make by the new rules, it was announced that the reserve ratio test would not be applied for three years; and to further moderate audit of transitional adjustments of taxpayer investment policy, in 1965 Revenue Procedure 65-13 was published, supplementing Guidelines with a set of rules which enable taxpayers to satisfy the reserve ratio test by trending toward a conformity of tax and actual lives. Altogether, present law tax depreciation policy may be characterized as a set of rules under which taxpayers may freely select from a set of depreciation methods (straight line, double declining balance, sum-of-years digits, etc.) allowable under Section 167 of the Code by which to distribute the cost of assets over their expected useful lives, and they may objectively establish the conformity of their depreciation deductions with their replacement policies by pre-established rules -- the reserve ratio test and supplementary transition rules.

Almost from the date of publication of Guidelines, critics have advocated abolition of the reserve ratio test. One body of criticism has centered on the alleged inability of the reserve ratio test to accommodate likely variances in growth rates of individual firms. However, an extensive simulation study published by the Treasury Department in 1968 rebuts these allegations.1/ A

1/ See Richard L. Pollock, Tax Depreciation and the Need for the Reserve Ratio Test, Tax Policy Research Study No. 2; Department of the Treasury, 1968.

more substantial body of criticism is based upon the contention that, in the dynamic world of business investment, the useful life of a depreciable asset is not a physical datum. The useful life depends on the "wearing-out" process, to be sure, but also on prices of replacement assets, expected value of output, capital costs, etc. Since estimates of useful life made when assets are acquired are likely to be found inaccurate because of changes in the variables noted above, it is arbitrary and constraining on sound investment behavior to bind taxpayers to a historically based reserve ratio test. Since even the reserve ratio test is arbitrary in this dynamic sense, it should be abandoned and replaced by a system of "capital allowance" deductions for tax purposes which are available to business taxpayers by "right."

It is beyond the scope of this report to evaluate this criticism and its implications for tax policy. However some comment on the proposed solution is appropriate here. In view of the admittedly great diversity of replacement policies among firms in the same industry and the still greater diversity between industries, an arbitrary system of capital allowances would necessarily result in inequalities in the tax treatment of private investment. For those taxpayers whose situation is (accidentally) accommodated by the prescribed allowances, no tax benefit would be derived; but for the greater number whose situation is not typical, tax benefits and penalties would result. Even if the periods for allowable cost recovery were sufficiently short that the depreciation deductions of substantially all taxpayers were increased, the degree of benefit to individual taxpayers would nevertheless vary, creating the same inequalities.

An obvious expectation under a system of arbitrary capital allowances is that pressure from those who are either not benefited, or are actually penalized by the existing allowance system, would be continually exerted on the Congress and Treasury to "liberalize" the allowances. (See the discussion below of the benefit to taxpayers of shortening lives and otherwise increasing the present value of depreciation deductions for an indication of the sizable benefits from such liberalizations.)

If the reserve ratio test were abandoned and all taxpayers permitted to use Guideline lives, some undeterminable revenue loss would doubtlessly result as those taxpayers who are now constrained from using the shorter Guideline lives by the reserve ratio test would adopt them. Moreover, this loss would be amplified in the short run if taxpayers were permitted to group their existing assets into Guideline classes and apply to them the higher depreciation rates implied by the Guidelines.

If the reserve ratio test is abandoned and replaced by a system of arbitrary capital allowances, either by amendment of the Internal Revenue Code or by new regulations, the Congress and Treasury Department would be thrust into the role of arbiter of industrial asset replacement policy. By its determination of "the" useful life of particular assets, and assuming prescribed lives would be set intentionally low, the government would be affecting investment incentive. To the extent the economic circumstances in which taxpayers find themselves dictate they should employ asset replacement policies that yield above average actual useful lives within their industrial (guideline) classification, these taxpayers will be benefited by the use of arbitrary capital allowances; but other taxpayers who have found it economic to employ rapid replacement policies and for whom the arbitrary allowances would not permit capital recovery within actual asset lifetimes, would be forced to pay higher effective tax rates. There would appear to be no economic principle by which

to justify providing an investment incentive to the former group and a disincentive to the latter. Indeed, this is recognized by advocates of arbitrary capital consumption allowances who generally recommend that taxpayers who can demonstrate that their economic circumstances warrant the use of shorter tax lives than are prescribed by statute or regulation be permitted to do so. But if some business taxpayers are able to justify particularized tax lives, in the interests of tax system neutrality with respect to private investment decisions, all taxpayers should do so.

(2) Disregard Salvage Value in the Computation of Allowable Depreciation

Under present law taxpayers are generally limited to an aggregate of depreciation deductions over the estimated useful life of assets no greater than the difference between cost, or other basis, and salvage value. However, in order to minimize taxpayer - Revenue Agent conflicts concerning reasonable estimates of salvage value, Section 167 (f) permits amounts of salvage value up to 10 percent of original basis to be disregarded. As a step toward further simplification and liberalization of tax depreciation, it is occasionally suggested that additional amounts of salvage value might be disregarded in computing allowable depreciation; and as the ultimate in simplification, salvage value might be completely disregarded.

The practical import of this proposal is obviously to increase the absolute amount of depreciation deductions available to the owner of a depreciable asset and, thereby, to increase the present value of allowable tax depreciation. Clearly, the value of this benefit, the incentive effect, will depend on whether taxpayers own depreciable assets possessing salvage value that can be disregarded, on their tax rates, on the expected life of the assets in question, and on the

depreciation method which they may use. Illustrative calculations of the benefit from disregarding an additional amount of salvage value equal to 10 percent of the original basis are shown in Table 2. The benefits are expressed as asset price reduction equivalents (See Part I), and are shown for taxpayers subject to 22 and 48 percent tax rates, using either straight line or SOYD depreciation methods, and for asset lives from 5 to 30 years. Inherently, this proposal provides greater tax benefits the shorter the asset life and the more accelerated the tax depreciation formula, and in common with all proposals to provide tax incentives via tax depreciation policy, it provides greater benefits to high-tax-rate asset owners (i.e., larger businesses) than to low-tax-rate owners. Since the margin of benefit is so much greater for short lived assets while being restricted to taxpayers who, in fact, have salvage value to ignore it is reasonable to infer that one of the side-effects of such a change in the tax laws would be to stimulate the growth of artificial asset ownership and trading patterns whose only function would be to maximize the amount of tax depreciation deductions. For example, if salvage value were disregarded, owners of assets with, say, a normal useful life of 10 years and a zero salvage value at the end of that period, would find it economically rewarding not to hold title to the asset but, rather, to "lease" its use from firms established for the purpose and who would arrange to "exchange" the asset frequently during the 10 years, each time restoring all or some of the basis. In the extreme, such purely tax avoidance arrangements might permit many capital assets to effectively be expensed. This tendency to create artificial leasing and

Table 2

Tax Benefit of Disregarding Additional Salvage Value Equal to 10 Percent of Original Basis

Asset life (years)	Asset price reduction equivalent, per $1,000 of original basis, if the tax rate is:			
	22 Percent		48 Percent	
	Depreciation method			
	Straight line	Sum-of-years digits	Straight line	Sum-of-years digits
5	$18.85	$20.56	$52.92	$59.25
10	14.19	16.96	37.21	46.27
15	11.10	14.30	27.87	37.55
20	8.95	12.28	21.84	31.35
25	7.41	10.72	17.73	26.77
30	6.28	9.47	14.80	23.27

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asset exchange arrangements always occurs when significant amounts of salvage value (in the hands of the asset owner) are ignored. 1/

Due to uncertainty about the extent of disregardable salvage and its distribution among business taxpayers, no revenue estimates could be prepared to indicate the tax loss which might be associated with such proposals.

B. Quantifiable Proposals to Liberalize Tax Depreciation

A number of proposals to liberalize tax depreciation policy may be conveniently grouped under the head of "accelerating" tax depreciation. By the methods described in Part I above, these proposals lend themselves to quantification, both as to their quality as investment incentives and as to the probable revenue losses which would be experienced in the event they were adopted. They are reviewed in this section in descending order of their stimulative effect, quantified as: (1) asset price reduction equivalents;

1/ A simple example may help to clarify the tax avoidance aspects of artificial lease agreements. Suppose that taxpayer A uses automobiles in his business and follows the custom of turning them in after three years. He pays $2,000 for each auto and assumesthe turn-in values of these autos are $1,200, $700, and $500 at the end of the first, second, and third years, respectively. Under present law, his depreciable basis, with a three year holding period is $1,300. If salvage value were ignored, his depreciable basis becomes $2,000. However, if salvage value were ignored and he "leased" the car for the same three years and if the "lessors" "exchanged" the car at the end of each year, depreciation deductions for the same car would aggregate $2,000 + $1,200 + $700 = $3,900. Thus, disregarding salvage would confront taxpayer A with the alternative of a present value of $2,000 of deductions if he holds title to the car or a present value of $3,900 in deductions if he were to "lease" the car.

(2) effective tax rates implied; and (3) rate of return. In all cases, the standard of reference is to the current situation of business taxpayers assumed to be using DDB methods, able to satisfy the reserve ratio test and following the half-year convention (see below for explanation). It is also assumed that a 12 percent after-tax rate of return is representative of the current situation; thus 12 percent is the discount rate which has been employed to calculate the differential incentive effects of the proposals.1/ And finally, all calculations are based on the assumption that no more than depreciable basis (original basis less salvage)is depreciated.2/

(1) Provide an Initial 40 Percent Allowance

A method for accelerating tax depreciation is the provision of an arbitrary allowance, usually expressed as a percentage of the original basis of the asset, in the first year of asset ownership. Since this method merely moves a portion of the aggregate allowable depreciation forward in time, it obviously results in acceleration in a manner easily controlled by the size of the initial allowance. The use of an initial allowance, sometimes called partial expensing, may be found in the tax laws of some foreign countries and in the financial accounting practices of domestic corporations. Here we consider the effect

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1/ Similar calculations have been made with 8 and 15 percent discount rates but are not presented here. Copies of tables for these rates are available from the Office of Tax Analysis on request. In general, if 12 percent is the overall rate of return on equity, a higher rate would be appropriate for "riskier than average" investment situations, a lower rate for "less risky" situations. Higher discount rates generally increase the value of tax depreciation acceleration; conversely, lower discount rates generally decrease acceleration benefits.

2/ Since DDB is the standard of reference, the calculations reflect a switch-over to straight line depreciation of the undepreciated balance when this is favorable.

of a 40 percent initial allowance, but the measures presented may easily be adapted to smaller allowances by a proportionality factor.

Due to the fundamental characteristic of an initial allowance that a fixed proportion of the depreciation occurs in the initial year, its economic effectiveness increases with the expected life of the asset for which it is allowed.1/ This is shown in Tables 3, 4, and 5: Table 3 shows that, as compared with the situation of taxpayers under present law, provision of a 40 percent initial allowance is the equivalent of an 8.4 percent asset price reduction to 48 percent taxpayers owning 10 year assets but a 15.1 percent price reduction to owners of 50 year assets; and for 22 percent taxpayers, the corresponding asset price reduction equivalents are 3.1 and 6.5 percent. Similarly, in Table 4 it may be seen that the effective tax rate of nominal 48 percent taxpayers would be reduced to 37.9 percent in the case of 10 year assets by a 40 percent initial allowance, and to 36.8 percent in the case of 50 year assets; the corresponding effective tax rates for nominal 22 percent taxpayers would be 15.7 and 15.1 percent. Or, put a third way, Table 5 shows that a 48 percent taxpayer would have his 12 percent rate of return on 10 year assets raised to 14.3 percent by a 40 percent initial allowance, whereas the rate of return on 50 year assets would be increased to 14.6 percent; and as with the previous measures, the 22 percent taxpayer's rate of return shows less beneficial effects, rising from 12 percent to 13.0 and 13.1 percent of 10 and 50 year assets, respectively.

1/ For a 10 year asset, the initial year's depreciation would be 20 percent of depreciable basis under the DDB method; an initial allowance of 40 percent is double this. For a 50 year asset, the initial year's depreciation is 4 percent of depreciable basis, also under DDB; thus a 40 percent initial allowance would be ten times this. Computations discussed below are based on the assumption that the initial allowance is taken first, then the first year's depreciation (of the reduced basis) is taken. If the allowance were merely added to "normal" first year depreciation (and subsequent deductions reduced accordingly) the contrast between short and long lived assets would be greater.

Table 3

Asset Price Reduction Equivalents of Selected Tax Depreciation Policy Changes, By Length of Useful Life, for Tax Rates of 22 and 48 Percent 1/

Present Useful Life, in Years	Asset Price Reduction Equivalents, if the tax rate is: 22% — Tax Depreciation Policy Options: Full-Year Convention	200% Declining Balance	40% Shorter Lives	40% Initial Allowance	48% — Tax Depreciation Policy Options: Full-Year Convention	200% Declining Balance	40% Shorter Lives	40% Initial Allowance
3	1.35	1.16	1.16	1.01	4.04	3.49	3.49	3.04
4	1.24	1.29	2.11	1.39	3.64	3.80	6.22	4.08
5	1.20	1.44	1.87	1.74	3.48	4.18	5.39	5.03
6	1.12	1.55	1.72	2.05	3.19	4.43	4.89	5.84
7	1.09	1.67	2.48	2.35	3.05	4.69	6.96	6.58
8	1.02	1.76	2.27	2.61	2.83	4.87	6.30	7.23
9	.99	1.85	2.92	2.86	2.71	5.06	8.01	7.83
10	.93	1.91	2.73	3.09	2.53	5.19	7.39	8.37
11	.91	1.98	2.54	3.30	2.43	5.32	6.81	8.86
12	.86	2.03	3.06	3.50	2.29	5.40	8.14	9.30
13	.83	2.08	2.87	3.68	2.20	5.49	7.57	9.71
14	.80	2.12	3.33	3.85	2.09	5.54	8.71	10.09
15	.77	2.15	3.11	4.02	2.01	5.60	8.09	10.43
16	.74	2.18	2.92	4.17	1.91	5.62	7.54	10.75
17	.72	2.20	3.31	4.31	1.85	5.65	8.48	11.05
18	.69	2.22	3.10	4.44	1.77	5.66	7.91	11.32
19	.67	2.23	3.44	4.56	1.71	5.67	8.73	11.58
20	.65	2.24	3.24	4.68	1.64	5.66	8.19	11.81
21	.63	2.25	3.06	4.79	1.59	5.65	7.67	12.04
22	.61	2.25	3.34	4.90	1.53	5.64	9.36	12.24
23	.59	2.26	3.16	5.00	1.48	5.62	7.87	12.44
24	.58	2.26	3.42	5.09	1.43	5.59	8.47	12.62
25	.56	2.25	3.23	5.18	1.39	5.57	7.98	12.79
26	.55	2.25	3.06	5.26	1.34	5.54	7.53	12.95
27	.53	2.24	3.28	5.34	1.31	5.50	8.05	13.11
28	.52	2.23	3.11	5.42	1.27	5.47	7.60	13.25
29	.51	2.23	3.31	5.49	1.23	5.43	8.07	13.39
30	.49	2.22	3.14	5.56	1.20	5.39	7.65	13.51
31	.48	2.21	2.99	5.62	1.17	5.35	7.24	13.64
32	.47	2.19	3.16	5.68	1.14	5.31	7.65	13.75
33	.46	2.18	3.01	5.74	1.11	5.26	7.26	13.86
34	.45	2.17	3.17	5.80	1.08	5.22	7.63	13.97
35	.44	2.15	3.02	5.86	1.06	5.17	7.26	14.07
36	.43	2.14	2.88	5.91	1.03	5.13	6.91	14.16
37	.42	2.13	3.02	5.96	1.01	5.08	7.23	14.25
38	.41	2.11	2.89	6.01	.99	5.04	6.89	14.34
39	.40	2.09	3.02	6.05	.96	4.99	7.19	14.42
40	.40	2.08	2.89	6.10	.94	4.95	6.86	14.50
41	.39	2.06	2.76	6.14	.92	4.90	6.55	14.58
42	.38	2.05	2.88	6.18	.90	4.85	6.82	14.65
43	.37	2.03	2.76	6.22	.89	4.81	6.53	14.72
44	.37	2.02	2.87	6.26	.87	4.76	6.77	14.79
45	.36	2.00	2.75	6.29	.85	4.72	6.48	14.85
46	.35	1.98	2.64	6.33	.84	4.67	6.21	14.91
47	.35	1.97	2.74	6.36	.82	4.63	6.44	14.97
48	.34	1.95	2.63	6.40	.81	4.58	6.17	15.03
49	.34	1.93	2.72	6.43	.79	4.54	6.38	15.08
50	.33	1.92	2.61	6.46	.78	4.50	6.13	15.14
51	.33	1.90	2.52	6.49	.76	4.46	5.89	15.19
52	.32	1.89	2.60	6.52	.75	4.41	6.08	15.24
53	.32	1.87	2.50	6.54	.74	4.37	5.85	15.29
54	.31	1.86	2.58	6.57	.73	4.33	6.03	15.33
55	.31	1.84	2.49	6.60	.72	4.29	5.80	15.38
56	.30	1.82	2.40	6.62	.70	4.25	5.59	15.42
57	.30	1.81	2.47	6.65	.69	4.21	5.75	15.46
58	.29	1.79	2.39	6.67	.68	4.17	5.55	15.51
59	.29	1.78	2.45	6.69	.67	4.13	5.70	15.54
60	.29	1.76	2.37	6.72	.66	4.09	5.50	15.58

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1/ The price reduction equivalents are computed on the assumptions that taxpayers presently use double-declining balance methods for tax depreciation, that actual lives are sufficiently close to tax lives, that the reserve ratio test would be satisfied, and that the discount rate is 12 percent.

Table 4

Effective Tax Rate Equivalents of Selected Tax Depreciation Policy Changes, By Length of Useful Life, for Tax Rates of 22 and 48 Percent 1/

Present Useful Life in Years	Effective Tax Rate Equivalents, if present tax rate is: 22% — Tax Depreciation Policy Options: Full-Year Convention	200% Declining Balance	40% Shorter Lives	40% Initial Allowance	48% — Tax Depreciation Policy Options: Full-Year Convention	200% Declining Balance	40% Shorter Lives	40% Initial Allowance
3	15.8	16.7	16.7	17.4	38.0	39.6	39.6	40.9
4	17.5	17.2	13.9	16.5	40.9	40.5	34.6	39.9
5	18.3	17.5	16.1	16.5	42.3	41.0	38.5	39.3
6	19.0	17.7	17.2	16.3	43.4	41.3	40.6	38.8
7	19.4	17.9	15.7	16.1	44.0	41.6	37.9	38.5
8	19.7	18.0	16.8	15.9	44.6	41.8	39.7	38.3
9	20.0	18.1	15.7	15.8	45.0	42.0	37.8	38.1
10	20.2	18.2	16.5	15.7	45.3	42.2	39.3	37.9
11	20.4	18.3	17.2	15.7	45.6	42.3	40.5	37.8
12	20.5	18.4	16.5	15.6	45.8	42.5	39.2	37.7
13	20.6	18.5	17.1	15.5	46.0	42.6	40.2	37.6
14	20.7	18.6	16.4	15.5	46.1	42.7	39.2	37.5
15	20.8	18.6	17.0	15.5	46.3	42.8	40.2	37.4
16	20.9	18.7	17.5	15.4	46.4	42.9	41.0	37.4
17	21.0	18.8	17.0	15.4	46.5	43.0	40.2	37.3
18	21.0	18.8	17.5	15.4	46.6	43.1	40.9	37.3
19	21.1	18.9	17.1	15.3	46.6	43.2	40.3	37.2
20	21.1	18.9	17.5	15.3	46.7	43.3	41.0	37.2
21	21.2	19.0	17.9	15.3	46.8	43.4	41.6	37.2
22	21.2	19.0	17.5	15.3	46.9	43.5	41.0	37.1
23	21.3	19.1	17.9	15.3	46.9	43.6	41.6	37.1
24	21.3	19.1	17.6	15.3	47.0	43.7	41.1	37.1
25	21.3	19.2	17.9	15.2	47.0	43.7	41.7	37.0
26	21.3	19.2	18.2	15.2	47.0	43.8	42.1	37.0
27	21.4	19.3	18.0	15.2	47.1	43.9	41.8	37.0
28	21.4	19.3	18.2	15.2	47.1	44.0	42.2	37.0
29	21.4	19.4	18.0	15.2	47.1	44.0	41.9	37.0
30	21.4	19.4	18.3	15.2	47.2	44.1	42.3	36.9
31	21.5	19.5	18.5	15.2	47.2	44.2	42.7	36.9
32	21.5	19.5	18.3	15.2	47.2	44.2	42.4	36.9
33	21.5	19.5	18.6	15.2	47.3	44.3	42.7	36.9
34	21.5	19.6	18.4	15.2	47.3	44.3	42.5	36.9
35	21.5	19.6	18.6	15.1	47.3	44.4	42.8	36.9
36	21.5	19.6	18.8	15.1	47.3	44.5	43.1	36.9
37	21.6	19.7	18.7	15.1	47.3	44.5	42.9	36.8
38	21.6	19.7	18.8	15.1	47.4	44.6	43.2	36.8
39	21.6	19.7	18.7	15.1	47.4	44.6	43.0	36.8
40	21.6	19.8	18.9	15.1	47.4	44.7	43.2	36.8
41	21.6	19.8	19.0	15.1	47.4	44.7	43.5	36.8
42	21.6	19.8	18.9	15.1	47.4	44.8	43.3	36.8
43	21.6	19.9	19.1	15.1	47.4	44.8	43.6	36.8
44	21.6	19.9	19.0	15.1	47.5	44.8	43.4	36.8
45	21.6	19.9	19.1	15.1	47.5	44.9	43.6	36.8
46	21.6	20.0	19.3	15.1	47.5	44.9	43.8	36.8
47	21.7	20.0	19.2	15.1	47.5	45.0	43.7	36.8
48	21.7	20.0	19.3	15.1	47.5	45.0	43.9	36.8
49	21.7	20.0	19.2	15.1	47.5	45.1	43.8	36.8
50	21.7	20.1	19.3	15.1	47.5	45.1	43.9	36.8

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1/ The effective tax rate equivalents are computed on the assumptions that taxpayers presently use double-declining balance methods for tax depreciation, that actual lives are sufficiently close to tax lives, that the reserve ratio test would be satisfied, and that the discount rate is 12 percent.

Table 9

Effective Tax Rate Equivalents of Selected Tax Depreciation Policy Changes, By Length of Useful Life, for Tax Rates of 22 and 48 Percent 1/

Present Useful Life in Years	Effective Tax Rate Equivalents, if present tax rate is: 22% — Tax Depreciation Policy Options: Full-Year Con-vention	300% Declining Balance	40% Shorter Lives	40% Initial Allowance	48% — Tax Depreciation Policy Options: Full-Year Con-vention	300% Declining Balance	40% Shorter Lives	40% Initial Allowance
3	15.8	16.7	16.7	17.4	38.0	39.6	39.6	40.9
4	17.5	17.2	13.9	16.2	40.9	40.5	34.6	39.9
5	18.3	17.5	16.1	16.5	42.3	41.0	38.5	39.3
6	19.0	17.7	17.2	16.3	43.4	41.3	40.6	38.8
7	19.4	17.9	15.7	16.1	44.0	41.6	37.9	38.5
8	19.7	18.0	16.8	15.9	44.6	41.8	39.7	38.3
9	20.0	18.1	15.7	15.8	45.0	42.0	37.8	38.1
10	20.2	18.2	16.5	15.7	45.3	42.2	39.3	37.9
11	20.4	18.3	17.2	15.7	45.6	42.3	40.5	37.8
12	20.5	18.4	16.5	15.6	45.8	42.5	39.2	37.7
13	20.6	18.5	17.1	15.5	46.0	42.6	40.2	37.6
14	20.7	18.6	16.4	15.5	46.1	42.7	39.2	37.5
15	20.8	18.6	17.0	15.5	46.3	42.8	40.2	37.4
16	20.9	18.7	17.5	15.4	46.4	42.9	41.0	37.4
17	21.0	18.8	17.0	15.4	46.5	43.0	40.2	37.3
18	21.0	18.8	17.5	15.4	46.6	43.1	40.9	37.3
19	21.1	18.9	17.1	15.3	46.6	43.2	40.3	37.2
20	21.1	18.9	17.5	15.3	46.7	43.3	41.0	37.2
21	21.2	19.0	17.9	15.3	46.8	43.4	41.6	37.2
22	21.2	19.0	17.5	15.3	46.9	43.5	41.0	37.1
23	21.3	19.1	17.9	15.3	46.9	43.6	41.6	37.1
24	21.3	19.1	17.6	15.3	47.0	43.7	41.1	37.1
25	21.3	19.2	17.9	15.2	47.0	43.7	41.7	37.0
26	21.3	19.2	18.2	15.2	47.0	43.8	42.1	37.0
27	21.4	19.3	18.0	15.2	47.1	43.9	41.8	37.0
28	21.4	19.3	18.2	15.2	47.1	44.0	42.2	37.0
29	21.4	19.4	18.0	15.2	47.1	44.0	41.9	37.0
30	21.4	19.4	18.3	15.2	47.2	44.1	42.3	36.9
31	21.5	19.5	18.5	15.2	47.2	44.2	42.7	36.9
32	21.5	19.5	18.3	15.2	47.2	44.2	42.4	36.9
33	21.5	19.5	18.6	15.2	47.3	44.3	42.7	36.9
34	21.5	19.6	18.4	15.2	47.3	44.3	42.5	36.9
35	21.5	19.6	18.6	15.1	47.3	44.4	42.8	36.9
36	21.5	19.6	18.8	15.1	47.3	44.5	43.1	36.9
37	21.6	19.7	18.7	15.1	47.3	44.5	42.9	36.8
38	21.6	19.7	18.8	15.1	47.4	44.6	43.2	36.8
39	21.6	19.7	18.7	15.1	47.4	44.6	43.0	36.8
40	21.6	19.8	18.9	15.1	47.4	44.7	43.2	36.8
41	21.6	19.8	19.0	15.1	47.4	44.7	43.5	36.8
42	21.6	19.8	18.9	15.1	47.4	44.8	43.3	36.8
43	21.6	19.9	19.1	15.1	47.4	44.8	43.6	36.8
44	21.6	19.9	19.0	15.1	47.5	44.8	43.4	36.8
45	21.6	19.9	19.1	15.1	47.5	44.9	43.6	36.8
46	21.6	20.0	19.3	15.1	47.5	44.9	43.8	36.8
47	21.7	20.0	19.2	15.1	47.5	45.0	43.7	36.8
48	21.7	20.0	19.3	15.1	47.5	45.0	43.9	36.8
49	21.7	20.0	19.2	15.1	47.5	45.1	43.8	36.8
50	21.7	20.1	19.3	15.1	47.5	45.1	43.9	36.8

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1/ The effective tax rate equivalents are computed on the assumptions that taxpayers presently use double-declining balance methods for tax depreciation, that actual lives are sufficiently close to tax lives, that the reserve ratio test would be satisfied, and that the discount rate is 12 percent.

Table 5

After-Tax Rate of Return Equivalents of Selected Tax Depreciation Policy Changes, by Length of Useful Life, for Tax Rates of 22 and 48 Percent 1/

Present Useful Life, in Years	After-Tax Rate of Return Equivalent, if the tax rate is: 22% — Tax Depreciation Policy Options: Full-Year Convention	300% Declining Balance	40% Shorter Lives	40% Initial Allowance	48% — Tax Depreciation Policy Options: Full-Year Convention	300% Declining Balance	40% Shorter Lives	40% Initial Allowance
3	13.0	12.8	12.8	12.7	14.3	13.9	13.9	13.6
4	12.7	12.7	13.2	12.8	13.6	13.7	15.1	13.9
5	12.6	12.7	12.9	12.8	13.3	13.6	14.2	14.0
6	12.5	12.7	12.7	12.9	13.1	13.5	13.7	14.1
7	12.4	12.6	13.0	12.9	12.9	13.5	14.3	14.2
8	12.3	12.6	12.8	12.9	12.8	13.4	13.9	14.2
9	12.3	12.6	13.0	13.0	12.7	13.4	14.4	14.3
10	12.3	12.6	12.8	13.0	12.6	13.3	14.0	14.3
11	12.3	12.6	12.7	13.0	12.6	13.3	13.7	14.4
12	12.2	12.6	12.9	13.0	12.5	13.3	14.0	14.4
13	12.2	12.5	12.8	13.0	12.5	13.2	13.8	14.4
14	12.2	12.5	12.9	13.0	12.4	13.2	14.0	14.4
15	12.2	12.5	12.8	13.0	12.4	13.2	13.8	14.4
16	12.2	12.5	12.7	13.0	12.4	13.2	13.6	14.5
17	12.2	12.5	12.8	13.0	12.4	13.1	13.8	14.5
18	12.1	12.5	12.7	13.0	12.3	13.1	13.6	14.5
19	12.1	12.5	12.8	13.0	12.3	13.1	13.8	14.5
20	12.1	12.5	12.7	13.0	12.3	13.1	13.6	14.5
21	12.1	12.5	12.6	13.0	12.3	13.1	13.5	14.5
22	12.1	12.5	12.7	13.0	12.3	13.0	13.6	14.5
23	12.1	12.4	12.6	13.0	12.3	13.0	13.5	14.5
24	12.1	12.4	12.7	13.0	12.2	13.0	13.6	14.5
25	12.1	12.4	12.6	13.0	12.2	13.0	13.5	14.5
26	12.1	12.4	12.6	13.0	12.2	13.0	13.4	14.5
27	12.1	12.4	12.6	13.0	12.2	12.9	13.4	14.5
28	12.1	12.4	12.6	13.0	12.2	12.9	13.3	14.5
29	12.1	12.4	12.6	13.0	12.2	12.9	13.4	14.5
30	12.1	12.4	12.6	13.0	12.2	12.9	13.3	14.6
31	12.1	12.4	12.5	13.1	12.2	12.9	13.2	14.6
32	12.1	12.4	12.6	13.1	12.2	12.9	13.3	14.6
33	12.1	12.4	12.5	13.1	12.2	12.9	13.2	14.6
34	12.1	12.4	12.6	13.1	12.2	12.8	13.3	14.6
35	12.1	12.4	12.5	13.1	12.2	12.8	13.2	14.6
36	12.1	12.4	12.5	13.1	12.2	12.8	13.1	14.6
37	12.1	12.4	12.5	13.1	12.2	12.8	13.2	14.6
38	12.1	12.4	12.5	13.1	12.1	12.8	13.1	14.6
39	12.1	12.3	12.5	13.1	12.1	12.8	13.2	14.6
40	12.1	12.3	12.5	13.1	12.1	12.8	13.1	14.6
41	12.1	12.3	12.5	13.1	12.1	12.8	13.0	14.6
42	12.1	12.3	12.5	13.1	12.1	12.7	13.1	14.6
43	12.1	12.3	12.4	13.1	12.1	12.7	13.0	14.6
44	12.1	12.3	12.5	13.1	12.1	12.7	13.1	14.6
45	12.1	12.3	12.4	13.1	12.1	12.7	13.0	14.6
46	12.1	12.3	12.4	13.1	12.1	12.7	13.0	14.6
47	12.1	12.3	12.4	13.1	12.1	12.7	13.0	14.6
48	12.1	12.3	12.4	13.1	12.1	12.7	12.9	14.6
49	12.1	12.3	12.4	13.1	12.1	12.7	13.0	14.6
50	12.1	12.3	12.4	13.1	12.1	12.7	12.9	14.6

1/ The after tax rate of return equivalents are computed on the assumptions that taxpayers presently use double declining balance methods for tax depreciation, that actual lives are sufficiently close to tax lives, that the reserve ratio test would be satisfied, and that the discount rate is 12 percent.

(2) Shorten Useful (Tax) Lives by 40 Percent

In the discussion of the reserve ratio test above, it was noted that a primary motive of proponents of its abandonment is to achieve acceleration of tax depreciation. If the reserve ratio were abandoned and if guideline lives were shortened by 40 percent, the same approximate ratio by which Bulletin F lives were lowered in the Guideline listings published in 1962, the benefits to business taxpayers resulting from the change are also shown in Tables 3-5.1/ In this instance the effectiveness of the policy change again varies with expected life of the asset, but due to the interaction between the depreciation rate and discount rate, the value of the benefit peaks for assets with approximately 20 year expected lives.2/ On the whole, shortening lives still awards the greater incentives to assets with expected lives greater than 10 years than to those with shorter expected lives.

(3) Declining Balance Depreciation Rates Greater than Double the Straight Line Rate

Just as introduction of double declining balance depreciation methods in 1954 accelerated the taking of depreciation deductions, so would an increase in the declining balance rate above twice the straight line rate further accelerate depreciation and thereby increase the present value of tax

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1/ The reader is cautioned that the calculations assume taxpayers with assets of indicated useful lives in Tables 3-5 are in conformance with the reserve ratio test so that a 40 percent reduction in lives, in fact, benefits them all.

2/ It may be observed in any of the tables that the progression of benefits from a 40 percent shortening of lives is not uniform. This results from the necessity of rounding the shortened lives to the nearest whole year. For example, an asset with an expected life of 10 years would be allowed a tax life of six years, which is 40 percent shorter; but an asset with an expected life of 11 years would be allowed a tax life of seven years (6.6 rounded to 7) which is actually 36 percent shorter.

must keep detailed property records in order to establish the period of time during a tax year they have owned depreciable assets in order to determine allowable depreciation, or they must consistently follow the simple convention that all assets acquired during a year were acquired at mid-year. This convention, called the "half-year" convention, assumes that assets are acquired at a uniform rate during the year and have been held for half a year, on the average. One way, then, to accelerate the taking of depreciation deductions by business taxpayers is to replace the half-year with a full-year convention. This would move up depreciation deductions a full six months and correspondingly increase their present value. Naturally, as compared with the options previously discussed, this yields a weak investment incentive. Moreover, as may be seen in Tables 3-5, the inherent characteristic of this policy change causes it to provide an incentive which varies inversely with asset life: moving up a 50 year stream of deductions six months can have relatively little effect compared with moving up a five year stream the same six months. This is easily seen in Tables 3-5: For a 48 percent taxpayer with a five-year asset, permitting a full-year convention is equivalent to a 3.5 percent asset price reduction, or a reduction in effective tax rate to 42.3 percent, or an increase in rate of return from 12 to 13.3 percent; the corresponding equivalents for a 50 year asset are an 0.8 percent asset price reduction, an effective tax rate of 47.5 percent, and a rate of return of 12.1 percent.

(5) Summary

As might be expected, depreciation liberalization provides a highly variable set of incentives. With the exception of substitution of the

full-year for half-year convention, all conventional "accelerating" policies tend to favor longer-lived as compared with shorter-lived assets. Thus, while depreciation liberalization constitutes a controllable investment incentive, it necessarily induces distortions of the pattern of private investment. Ironically, the distortions are most severe precisely in those instances when investment incentives may be expected to be effective, that is, in those industries which are capital intensive but which differ among each other in the expected useful lives of the assets they employ. Finally, investment incentives provided through tax depreciation policy necessarily favor large relatively to small businesses since so much of the value of the incentive is dependent on tax deferral and, hence, on the nominal tax rate.

Part III

Revenue Estimates

In much the same way that evaluation of the incentive effects of depreciation tax policies is complicated by a need to compare different time patterns of depreciation deductions, so are estimates of the revenue losses that might result. When a depreciation policy is liberalized, even if the new policy is limited to newly acquired assets, revenue losses mount rapidly, for the assets acquired each year include, largely, replacements of assets which had been subject to the old policy. As a consequence, the rapid growth of assets eligible for the liberalized depreciation generates a large volume of deductions and revenue losses. As the stock of depreciable assets eligible for the liberalized depreciation grow through an average replacement cycle, the bulge of depreciation deductions moderates and, in the absence of sufficiently large net growth in the stock itself, will actually turn down. But, if there is a normal underlying growth trend, revenue losses continue to mount, for the growth in newly acquired assets ensures that depreciation deductions attributable to "young" assets will outweigh those contributed by "old"assets. Thus, estimates of the change in future levels of deductions may be derived only from projections of annual investments and by calculating the effect of depreciation policy changes on depreciation deductions attributable to these investments.

In order to systematize the revenue estimation process and to provide detail which might assist in the evaluation of investment incentive benefits corresponding to the estimates of revenue loss, the Treasury Department has

developed a computer model for the purpose. The basic inputs to this model are: (1) a set of estimated 1971 gross investment expenditures, in 62 different asset-industry categories, which are listed in Appendix A and (2) a set of corresponding useful lives, also shown in Appendix A. The investment expenditures are consistent with projections of the Council of Economic Advisors when estimated expenditures for owner-occupied dwellings are eliminated from their estimates. Altogether, the basic investment input to the model estimates a gross expenditure on tax depreciable assets of $126 billion in 1971, 60 percent of which is estimated as expenditures on machinery and equipment, 40 percent on structures. (See Table 6) And since depreciable basis will grow corresponding to some growth rate, the computer model applies a uniform growth rate of 5 percent to the 1971 figures to derive annual gross investment in depreciable assets beyond 1971.1/

In computing the revenue losses which will be generated by this fixed composition of future outlays, the computer model employed this logic:

(1) Each depreciation policy change proposal was compared with the present law situation in each of the 62 asset categories to determine the annual differences in depreciation deductions which would result from the change. In computing this change, recognition was given to the fact that, for a number of reasons, not all assets in all categories are depreciated by the most accelerated methods allowed under present law (see Appendix A).

1/ This assumed growth rate may be compared with the Council of Economic Advisors' estimate of a real growth rate of 4.3 percent. In order to accommodate the built-in inflation bias of index numbers, which do not account for product improvement, and since depreciation deductions are based on current prices paid for depreciable assets, it appeared that a 5 percent growth rate is a conservative basis on which to project gross investment in current, rather than real, dollars, but without incorporating extraordinary inflation.

(2) The extra depreciation deductions thus computed were summed and converted into estimated revenue losses by applying an average tax rate of 45 percent. This tax rate has proved reliable in previous business income tax revenue estimations and appears to successfully reflect the composition of corporate and unincorporated businesses as well as the proportion of business income not subject to tax because of carry-forward of operating losses by enterprises.

The estimates of tax revenue loss associated with a variety of tax depreciation policy changes produced by the computer model are shown in Table 7 for specified years, 1971 to 1990; the full listing of estimates by year, 1971 to 1995 may be found in Appendix B. For convenience in appraising the magnitudes of revenue loss estimates, the first row of Table 7 presents a set of present law business income tax revenue estimates; this reference estimate includes taxes attributable to both unincorporated enterprises and corporations and is based upon assumptions which are consistent with those underlying the revenue loss estimates. The sections immediately following review the revenue estimates, and this part is concluded with a brief discussion of the relevance of induced economic growth in an evaluation of these revenue estimates.

A. Initial Allowances

In Part II the investment incentive effectiveness of a 40 percent initial allowance was noted as exceeding that of the other depreciation liberalization policies examined. Reflecting this, the estimated revenue losses shown in Table 7 are also largest of the options examined. Because initial allowances immediately increase taxpayers' depreciation deductions (and subsequently

Table 6

Estimated 1971 Gross Investment Expenditures

(Dollar amounts in billions)

	Total		Equipment		Structures	
Industry:						
All industries	126	(100%)	76	(100%)	50	(100%)
	(100%)		(60%)		(40%)	
Non-Farm:						
Manufacturing	26	(21%)	19	(25%)	7	(14%)
	(100%)		(73%)		(27%)	
Non-manufacturing	93	(74%)	50	(66%)	43	(86%)
	(100%)		(54%)		(46%)	
Farm	8	(6%)	7	(9%)	1	(2%)
	(100%)		(88%)		(12%)	

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Source: See Appendix A

Note: Individual entries may not add to totals due to rounding.

Table 7

Estimated Revenue Losses Associated With Specified Changes in Tax Depreciation Policy, by Industry Category and Class of Depreciable Assets; Selected Calendar Years 1971-1990

Item	Estimated Revenues (Billions of Dollars)				
	1971 1/	1975	1980	1985	1990
Total business income taxes, reference estimate 2/	48	58	74	95	121
Revenue losses:					
Total, All Industries					
40 percent initial allowance	21.0	15.9	14.1	15.3	18.2
20 percent initial allowance	10.5	7.9	7.0	7.7	9.1
40 percent shorter lives	2.3	11.2	10.9	12.6	16.4
20 percent shorter lives	.9	4.7	5.3	5.4	7.2
300 percent declining balance	1.7	6.0	6.3	7.3	8.6
Full year convention	4.1	2.6	2.2	2.1	2.7
7 percent investment credit 3/	5.6	6.9	8.8	11.2	14.3
Equipment					
40 percent initial allowance	12.2	6.8	4.3	4.4	5.6
20 percent initial allowance	6.1	3.4	2.2	2.2	2.8
40 percent shorter lives	1.9	8.4	5.3	4.2	5.1
20 percent shorter lives	.8	3.7	3.1	2.1	2.4
300 percent declining balance	1.3	3.4	2.0	1.8	2.2
Full year convention	3.6	2.1	1.5	1.4	1.8
7 percent investment credit 3/	3.4	4.1	5.3	6.7	8.6
Structures					
40 percent initial allowance	8.8	9.1	9.8	10.9	12.6
20 percent initial allowance	4.4	4.5	4.9	5.5	6.3
40 percent shorter lives	.4	2.8	5.7	8.4	11.2
20 percent shorter lives	.1	1.1	2.3	3.4	4.8
300 percent declining balance	.4	2.6	4.4	5.5	6.4
Full year convention	.5	.6	.6	.7	.9
7 percent investment credit 3/	2.3	2.7	3.5	4.5	5.7
Total, Non-Farm, Non-Manufacturing					
40 percent initial allowance	15.5	12.0	10.9	12.0	14.1
20 percent initial allowance	7.8	6.0	5.5	6.0	7.0
40 percent shorter lives	1.6	8.0	8.1	9.8	12.5
20 percent shorter lives	.6	3.3	3.7	4.2	5.6
300 percent declining balance	1.1	4.1	4.6	5.4	6.4
Full year convention	3.0	1.9	1.5	1.6	2.0
7 percent investment credit 3/	4.2	5.1	6.5	8.3	10.6

Item	Estimated Revenues (Billions of Dollars)				
	1971 1/	1975	1980	1985	1990
Total. Non-Farm, Non-Manufacturing Continued					
Equipment					
40 percent initial allowance	8.0	4.3	2.7	2.9	3.6
20 percent initial allowance	4.0	2.2	1.3	1.4	1.8
40 percent shorter lives	1.3	5.5	3.4	2.7	3.2
20 percent shorter lives	.5	2.3	1.8	1.3	1.5
300 percent declining balance	.8	2.0	1.1	1.0	1.3
Full year convention	2.5	1.4	.9	1.0	1.2
7 percent investment credit 3/	2.3	2.7	3.5	4.5	5.7
Structures					
40 percent initial allowance	7.5	7.7	8.2	9.1	10.5
20 percent initial allowance	3.7	3.8	4.1	4.6	5.3
40 percent shorter lives	.3	2.5	4.9	7.1	9.3
20 percent shorter lives	.1	.9	2.0	2.9	4.0
300 percent declining balance	.3	2.1	3.6	4.4	5.1
Full year convention	.5	.5	.5	.6	.8
7 percent investment credit 3/	1.9	2.3	3.0	3.8	4.8
Total, Manufacturing					
40 percent initial allowance	4.3	3.0	2.5	2.7	3.3
20 percent initial allowance	2.1	1.5	1.3	1.4	1.6
40 percent shorter lives	.5	2.4	2.2	2.2	3.1
20 percent shorter lives	.2	1.0	1.2	.9	1.3
300 percent declining balance	.4	1.6	1.5	1.6	1.9
Full year convention	.9	.6	.5	.4	.6
7 percent investment credit 3/	1.2	1.4	1.8	2.3	2.9
Equipment					
40 percent initial allowance	3.1	1.8	1.2	1.2	1.5
20 percent initial allowance	1.6	.9	.6	.6	.7
40 percent shorter lives	.5	2.1	1.5	1.1	1.4
20 percent shorter lives	.2	.9	.9	.5	.6
300 percent declining balance	.4	1.2	.7	.6	.7
Full year convention	.9	.5	.4	.4	.4
7 percent investment credit 3/	.9	1.0	1.3	1.7	2.2
Structures					
40 percent initial allowance	1.2	1.2	1.4	1.6	1.8
20 percent initial allowance	.6	.6	.7	.8	.9
40 percent shorter lives	4/	.3	.7	1.1	1.7
20 percent shorter lives	4/	.1	.3	.4	.7
300 percent declining balance	.1	.4	.7	1.0	1.2
Full year convention	.1	.1	.1	.1	.1
7 percent investment credit 3/	.3	.4	.5	.6	.8

	Estimated Revenues (Billions of Dollars)				
	1971 1/	1975	1980	1985	1990
Total, Farm					
40 percent initial allowance	1.2	.9	.6	.7	.8
20 percent initial allowance	.6	.4	.3	.3	.4
40 percent shorter lives	.1	.8	.7	.6	.8
20 percent shorter lives	.6	.4	.4	.3	.4
300 percent declining balance	.1	.4	.3	.3	.3
Full year convention	.2	.2	.2	.1	.2
7 percent investment credit 3/	.3	.4	.5	.6	.8
Equipment					
40 percent initial allowance	1.0	.7	.4	.4	.5
20 percent initial allowance	.5	.4	.2	.2	.3
40 percent shorter lives	.1	.8	.6	.4	.5
20 percent shorter lives	.1	.4	.4	.2	.3
300 percent declining balance	.1	.3	.2	.1	.2
Full year convention	.2	.2	.1	.1	.1
7 percent investment credit 3/	.3	.3	.4	.6	.7
Structures					
40 percent initial allowance	.2	.2	.2	.2	.3
20 percent initial allowance	.1	.1	.1	.1	.1
40 percent shorter lives	4/	4/	.1	.2	.3
20 percent shorter lives	4/	4/	4/	.1	.1
300 percent declining balance	4/	4/	.1	.1	.1
Full year convention	4/	4/	4/	4/	4/
7 percent investment credit 3/	4/	.1	.1	.1	.1

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1/ Revenue estimates for tax policy changes were computed on the assumption changes would apply to property put in place after December 31, 1970. Thus, in the case of initial allowances and adoption of the full year convention, full year benefits are available in 1971; but in the cases of shortened tax lives and 300 percent declining balance depreciation, under the present half year convention, only one-half the annual benefit is available in 1971.

2/ Includes estimates for unincorporated enterprises and corporations electing to be taxed as partnerships under Subchapter S of the Internal Revenue Code. Does not include estimates of reductions in tax payable due to investment credit for pre-repeal property placed in service during calendar year 1971, and thereafter, nor due to unused pre-repeal credit carried forward. The estimates for 1971 and later years are constructed to be consistent with the basis on which revenue losses were estimated; they assume full employment and an annual growth rate of 5 percent.

3/ It is assumed that the investment credit is only 65 percent effective, as suggested by the experience of 1962-68 under the investment credit for machinery and equipment. Less stringent income limitations on eligibility for the credit and more generous allowance of the credit for assets of shorter life would increase the percentage effectiveness of an investment credit.

4/ Less than $50 million.

lower them), the first year effect is considerable, an estimated $21 billion, which is nearly 44 percent of the reference business income tax level in 1971. The revenue losses decline for approximately eight years, at which time the continued effect of the growth rate has begun to offset the effect of diminished depreciation deductions for assets acquired in the initial years of the policy change. By 1990, the 40 percent initial allowance would generate a revenue loss of $18.2 billion, which is then 15 percent of the reference business tax level. A 20 percent initial allowance, which would have half the effectiveness of a 40 percent allowance, has the same time pattern of revenue losses but at half the cost.

The distribution of these tax losses (and the benefits) is shown in Table 8. In the first year, 74 percent of the revenue loss is absorbed by non-farm, non-manufacturing enterprises, and by 1990, a year which is representative of the long run impact, the share absorbed by this sector of the economy has risen to 77 percent. On the whole, the distribution of benefits from this depreciation policy change roughly matches the pattern of investment by sector: manufacturing investment expenditure is 21 percent of the total (see Table 6) and will generate 18 percent of long run tax losses while farm investment expenditure is approximately 8 percent of the total and generates 4 percent of the tax losses. However, investment in structures, which accounts for only 40 percent of estimated annual expenditure on depreciable assets, absorb 69 percent of the 1990 tax loss. The reason for this increasing share of tax losses being attributable to structures is their markedly longer useful life.

Summary Estimated Revenue Losses, by Industry Category
and Class of Depreciable Assets, 1971 and 1990

Tax policy change, industrial category	Estimated Revenue Loss (dollar amounts in billions)					
	1971			1990		
	Total	Equipment	Structures	Total	Equipment	Structures
40% Inital Allowance						
All industries	21.0 (100%) (100%)	12.2 (100%) (58%)	8.8 (100%) (42%)	18.2 (100%) (100%)	5.6 (100%) (31%)	12.6 (100%) (69%)
Non-Farm						
Manufacturing	4.3 (20%) (100%)	3.1 (25%) (72%)	1.2 (13%) (28%)	3.3 (18%) (100%)	1.5 (26%) (44%)	1.8 (14%) (56%)
Non-manufacturing	15.5 (74%) (100%)	8.0 (66%) (52%)	7.5 (85%) (48%)	14.1 (77%) (100%)	3.6 (64%) (25%)	10.5 (83%) (75%)
Farm	1.2 (6%) (100%)	1.0 (8%) (86%)	0.2 (2%) (14%)	0.8 (4%) (100%)	0.5 (10%) (68%)	0.3 (2%) (32%)
40% Shorter Lives						
All industries	2.3 (100%) (100%)	1.9 (100%) (84%)	0.4 (100%) (15%)	16.4 (100%) (100%)	5.1 (100%) (31%)	11.2 (100%) (69%)
Non-Farm						
Manufacturing	0.5 (24%) (100%)	0.5 (26%) (93%)	a/ (11%) (7%)	3.1 (19%) (100%)	1.4 (27%) (44%)	1.7 (15%) (56%)
Non-manufacturing	1.6 (70%) (100%)	1.3 (66%) (81%)	0.3 (87%) (19%)	12.5 (76%) (100%)	3.2 (63%) (26%)	9.3 (82%) (74%)
Farm	0.1 (6%) (100%)	0.1 (7%) (96%)	a/ (2%) (4%)	0.8 (5%) (100%)	0.5 (10%) (66%)	0.3 (2%) (34%)

(Continued)

Tax policy change, industrial category	Estimated Revenue Loss (dollar amounts in billions)					
	1971			1990		
	Total	Equipment	Structures	Total	Equipment	Structures
300% Declining Balance Depreciation						
All industries	1.7 (100%) (100%)	1.3 (100%) (79%)	0.4 (100%) (21%)	8.6 (100%) (100%)	2.2 (100%) (25%)	6.4 (100%) (74%)
Non-Farm						
Manufacturing	0.4 (26%) (100%)	0.4 (29%) (88%)	0.1 (14%) (12%)	1.9 (22%) (100%)	0.7 (34%) (20%)	1.2 (18%) (80%)
Non-manufacturing	1.1 (69%) (100%)	0.8 (65%) (74%)	0.3 (84%) (26%)	6.4 (74%) (100%)	1.3 (58%) (39%)	5.1 (79%) (61%)
Farm	0.1 (5%) (100%)	0.1 (6%) (93%)	a/ (2%) (7%)	0.3 (4%) (100%)	0.2 (8%) (58%)	0.1 (2%) (42%)

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Note: Figures may not add to totals due to rounding.
Percentages computed on the basis of information from Appendix B.

a/ Less than $50 million.

As the data in Appendix A indicate, structures have a typical useful life of 35 years whereas half the investment in machinery and equipment has a useful life of seven years or less; and just as 35 year assets derive an investment incentive from a 40 percent initial allowance that is more than twice as great as the incentive derived by seven year assets, so does a dollar's worth of investment in the 35 year assets generate more than twice the revenue loss of a dollar invested in seven year assets.

B. Abandonment of the Reserve Ratio Test and Shortening of Tax Lives

Second to a 40 percent initial allowance in investment incentive effectiveness is a 40 percent reduction in tax lives; accordingly, it is second in tax costliness. Due to the operation of the half year convention, the first year loss is only $2.3 billion, about 5 percent of the 1971 reference business income tax; but, the loss rises to $16.4 billion by 1990 when it becomes 13.5 percent of the reference tax level. Although, in the very long run, a 20 percent shortening of tax lives will result in half the revenue loss of a 40 percent reduction, the revenue losses are less than half even in 1990. The reason for this is that revenue losses do not stabilize at their long run levels until at least one replacement cycle for all assets has been completed; and since structures loom so large in the total depreciable asset base and also have extremely long lives, not until well after the year 2000 would the revenue loss from 20 percent shorter lives reach half the level of that from 40 percent shorter lives.

The distribution of tax losses (and benefits) from shortening of lives is almost identical with that noted above for initial allowances (see Table 8).

Non-farm, non-manufacturing enterprises absorb 76 percent of the revenue loss; overall, structures account for 68 percent of the revenue loss.

C. Declining Balance Depreciation at 300 Percent the Straight Line Rate

Somewhat less effective as an investment incentive than a 40 percent shortening of tax lives, but more effective than a 20 percent shortening would be, is the additional acceleration of depreciation deductions provided by the 300 percent declining balance method. It is not surprising, therefore, that the estimated revenue losses that would result from introducing 300 percent declining balance methods range between the two tax life shortening options. The estimated first year revenue loss with 300 percent declining balance depreciation, again kept low by the half year convention, is $1.7 billion, or about 3.5 percent of the reference business income tax for 1971, and rises thereafter to $8.6 billion in 1990 when it would be a little more than 7 percent of the reference level.

Although the distribution of revenue losses under 300 percent declining balance depreciation is not unlike the patterns for the other two depreciation liberalization options portrayed in Table 8, it is noteworthy that the share of the long run revenue loss absorbed by structures is larger, 74 percent as compared with 69 and 68 percent under a 40 percent initial allowance and 40 percent shorter tax lives, respectively. The reason for this is traceable to the present law restriction on non-residential structures' depreciation to that computed by methods no more accelerated than 150 percent declining balance methods. Since machinery and equipment may be depreciated by

200 percent declining balance methods, a change to 300 percent declining balance depreciation is relatively more beneficial to investment in non-residential structures.

To the extent the distinction between structures and other assets which is presently drawn in the Internal Revenue Code is based upon a real difference between the actual depreciation patterns of the two classes of assets, this serves to emphasize the likelihood that highly generalized changes in tax depreciation policy, or other investment incentives, will unintentionally induce distortions of private investment decisions. Not only do generalized changes have differential incentive effects on different classes of assets due to their differences in durability, as was shown in Part II above, but generalized changes will also disturb the relationship between tax depreciation and what might be called "true" depreciation. For example, at the present time there are doubtlessly assets whose economic depreciation, as manifested in established market prices for assets of different vintages, is more closely described by a large first year decline in value followed by a constant percentage decline; 1/ presently allowable accelerated depreciation formulas impose a real penalty on the ownership of these assets. At the other extreme would be assets whose economic depreciation, also manifested in established

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1/ Characteristic assets which would follow such a pattern are those for which installation (and removal) costs are large relatively to total acquisition cost and those, such as automobiles, which appear to give off successively "inferior" services as they age. For an econometric study of automobile depreciation patterns, see Frank C. Wykoff, "Capital Depreciation in the Postwar Period: Automobiles," Review of Economics and Statistics; May, 1970, pp. 168-172.

market prices, follows a pattern in which there is little decline in value during the first portion of the asset's life and a progressively increasing rate of decline as it approaches its replacement date; 1/ presently allowable depreciation methods confer a positive tax benefit, or bias toward, ownership of such assets. Then a change toward liberalization of tax depreciation policy would relieve the former class of assets of an implicit penalty but augment the tax subsidy to the latter.

D. The Full Year Convention

The discussion of Part II concluded that permitting taxpayers to use the full year rather than half year convention would yield minimal investment incentive effectiveness. Accordingly, the estimated long run revenue cost of such a tax depreciation liberalization is also small, amounting to a mere $2.7 billion in 1990, or a little more than 2.2 percent of the reference business tax level at that time. However, inherent in the characteristics of this proposal is a large first year loss; $4.1 billion, which is 8.5 percent of the 1971 reference level. Since the incentive effectiveness of this policy change is negligible, it would appear that the prime function which might be served by its adoption is to generate a large one-time revenue loss with little or no long run consequences, an action which might be desirable under certain conditions.

E. Summary

Generally, tax depreciation liberalization results in relatively large short term (one to five years) revenue losses. This is particularly true

1/ An analysis of office building operating expense and rental income data by Professors Taubman and Rasche suggest that such a pattern is typical for investment in this class of structures. See Paul J. Taubman and Robert H. Rasche "Economic and Tax Depreciation of Office Buildings," National Tax Journal, pp. 334-346, September 1969.

for the initial allowance proposals and the full year convention, since neither is restrained the first year by the half year convention. In the long run, the extent of revenue losses are variable among the options examined, roughly proportional to their incentive effectiveness. Excepting the full year convention, the policy options reviewed here tend to disproportionately benefit investment in structures, since this is the class of assets with the longest useful (and tax) lives. In all instances, the sectors of the economy which derive the greatest benefit are those included in non-farm, non-manufacturing (public utilities, transportation, communication, trade, services, real estate and finance), since enterprises so classified account for the bulk of investment in tax depreciable assets, particularly structures.

F. Concluding Comment on Induced Growth Rate Increases and Their Role in Evaluation of Tax Depreciation Policy Changes

It will be recalled that the computer model employed to estimate the revenue losses discussed above explicitly assumes the economic growth rate is independent of the stimulus to investment which may be produced by the policy changes examined. The objection may therefore be raised that the revenue estimates presented in Table 7 and Appendix B overstate the revenue losses which may occur, particularly over the period three or more years beyond the date of adoption. A principal reason for considering tax depreciation liberalization is that the result is expected to stimulate investment; a higher investment rate will result in a larger private capital stock; and a larger capital stock will raise the national output to a level higher than it would otherwise have been. If national output in the future has been increased as a result of tax liberalization, surely, so the argument runs,

the increased taxes generated by the higher national income ought to be considered in the assessment of future tax revenues as an offset to the losses computed as in this report. Moreover, if the policy changes are being considered in a period of less than full employment, should not the increase in employment and output (which generates higher taxes) that would result from private business response to enactment of investment incentives be accounted for in the revenue estimates?

There is some merit in this criticism of traditional methods of tax revenue estimation with respect to evaluation of business tax policy options - as is illustrated in this report.

The difficulty with all this is specifying how much an increase in depreciation deductions would increase the rate of investment. In the first place, a change in depreciation policy would increase the demand for investment goods subject to the changed rules. How much is a matter of dispute. This could mean a net increase of investment or merely a diversion of investment from short to long lived assets. The experience under the investment credit was that much of the response to business investment incentives was diversion of savings from structures (housing and otherwise) to machinery and equipment, since structures were not eligible for the credit. Given some net increase in investment, it is still a matter of some dispute how much this increases real output, and thus the tax base.

A further problem in all this is that there are other things that the government could do to increase investment, including spend more on education, spend more on research, reduce the corporate tax rate, etc. To talk

authoritatively about the effect of a depreciation change, one would have to ask what were the growth effects of policies that might otherwise have been implemented with the foregone tax revenues.

A further problem is that some of the depreciation alternatives offered would considerably favor one kind of investment over another. To the extent that some investment is diverted from what would have been more efficient uses, absent the new tax considerations, these could be an offset to induced growth.

In view of the uncertainty surrounding these issues, it seems preferable to simply report how much government would be doing to increase the growth rate if we changed depreciation rules in particular ways. It remains open to supporters of any particular change to present their arguments as to just how much the change would affect the growth rate, and make appropriate adjustments.

Appendix A

Investment Estimates and Present Law Tax Depreciation Inputs
to Department of the Treasury Depreciation Policy Revenue Estimating Model

Type of Investment	Estimated Gross Investment, 1971 (millions of dollars) 1/	Present Law Tax Depreciation Assumptions	
		Useful Life 2/	Percent Using Straight Line Depreciation 2/
All Industries: Total	125,864	--	--
Equipment	75,656	--	--
Structures	50,208	--	--
Non-Farm, Non-Manufacturing: Total	92,863	--	--
Equipment: Total	50,269	--	44
1. Furniture	2,694	12	
2. Fabricated Metal Products	1,457	14	
3. Engines and Turbines	1,120	17	
4. Tractors	578	6	
5. Construction Machinery	1,974	6	
6. Mining Machinery	829	8	
7. Metal Working Machinery	712	13	
8. Special Industry Machinery	1,307	13	
9. General Industry Machinery	1,478	11	
10. Office and Store Machinery	5,967	6	
11. Service-Industry Machinery	2,910	8	
12. Electrical Machinery	6,822	11	
13. Trucks and Buses	6,806	7	
14. Passenger Cars	5,536	3	
15. Aircraft	4,009	7	
16. Ships and Boats	556	18	
17. Railroad Equipment	912	19	
18. Instruments	3,091	9	
19. Miscellaneous	1,511	8	
Structures: Total	42,594	--	36 3/
20. Industrial	462	28	
21. Commercial and Miscellaneous	122	23	
22. Commercial and Miscellaneous	4,338	28	
23. Commercial and Miscellaneous	6,748	35	

Type of Investment	Estimated Gross Investment, 1971 (millions of dollars) 1/	Present Law Tax Depreciation Assumptions: Useful Life 2/	Present Law Tax Depreciation Assumptions: Percent Using Straight Line Depreciation 2/
24. Institutional Excluding Social and Recreational	4,548	42	
25. Social and Recreational: Institutional	296	42	
26. Social and Recreational: Non-Institutional	690	23	
27. Pipelines	201	20	
28. Railroad	566	45	
29. Telephone and Telegraph	2,164	17	
30. Other Public Utilities	6,613	26	
31. Petroleum and Natural Gas 4/	2,120	14	
32. Residential	13,000	40	3/
33. All Other Private	726	28	
Manufacturing: Total	25,861	--	--
Equipment: Total	19,191	--	21
34. Furniture	458	11	
35. Fabricated Metal Products	648	13	
36. Engines and Turbines	222	16	
37. Tractors	82	6	
38. Construction Machinery	449	6	
39. Metal Working Machinery	3,472	12	
40. Special Industry Machinery	4,010	12	
41. General Industrial Machinery	2,451	10	
42. Office and Store Machinery	2,189	6	
43. Service-Industry Machinery	284	7	
44. Electrical Machinery	1,389	11	
45. Trucks and Buses	1,325	6	
46. Passenger Cars	352	3	
47. Aircraft	482	6	
48. Ships and Boats	39	18	
49. Railroad Equipment	66	18	
50. Instruments	1,050	8	
51. Miscellaneous	223	8	
Structures: Total	6,670	--	21
52. Industrial	6,670	35	

Type of Investment	Estimated Gross Investment, 1971 (millions of dollars) 1/	Present Law Tax Depreciation Assumptions: Useful Life 2/	Present Law Tax Depreciation Assumptions: Percent Using Straight Line Depreciation 2/
Farm: Total	7,140	--	--
Equipment: Total	6,196	--	44
53. Fabricated Metal Products	66	14	
54. Engines and Turbines	25	17	
55. Tractors	1,368	10	
56. General Industrial Machinery	100	11	
57. Service-Industry Machinery	56	8	
58. Trucks	1,113	9	
59. Passenger Cars	871	8	
60. Miscellaneous	84	8	
61. Agricultural Machinery	2,513	13	
Structures: Total	944	--	36
62. Non-Residential	944	34	

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1/ Office of Tax Analysis estimates for 1971 based on expenditure date furnished by Robert Wasson of the Office of Business Economics, U. S. Department of Commerce.

2/ Based on lives estimated by Allan H. Young, "Alternative Estimates of Corporation Depreciation," Survey of Current Business, April 1968.

3/ It is assumed that 36 percent of the non-farm, non-manufacturing structures are depreciated under the straight line method except that only 20 percent of the residential structures are depreciated under the straight line method.

APPENDIX B

Estimated Revenue Losses, By Industrial Category and
Class of Depreciable Asset, 1971-1995

I. 40 Percent Initial Allowance

(Millions of Dollars)

		Non-Manufacturing			Manufacturing			Farming		
Year	Total	Total	Equipment	Structures	Total	Equipment	Structure	Total	Equipment	Structure
1971	21001.	15522.	8038.	7484.	4230.	3103.	1127.	1198.	1032.	167.
1972	19108.	14185.	6684.	7501.	3827.	2639.	1189.	1097.	928.	168.
1973	17704.	13202.	5668.	7534.	3491.	2288.	1205.	1011.	841.	171.
1974	16650.	12475.	4891.	7584.	3235.	2015.	1218.	939.	766.	173.
1975	15863.	11954.	4303.	7651.	3032.	1794.	1238.	877.	701.	176.
1976	15130.	11458.	3724.	7734.	2850.	1591.	1259.	822.	643.	179.
1977	14562.	11067.	3235.	7832.	2723.	1445.	1283.	768.	586.	182.
1978	14251.	10880.	2936.	7944.	2655.	1347.	1310.	715.	528.	186.
1979	14114.	10851.	2781.	8070.	2596.	1257.	1339.	667.	477.	190.
1980	14081.	10901.	2691.	8210.	2543.	1173.	1370.	636.	442.	195.
1981	14113.	10935.	2623.	8363.	2506.	1101.	1405.	622.	423.	199.
1982	14246.	11133.	2605.	8527.	2495.	1053.	1442.	619.	414.	205.
1983	14516.	11364.	2660.	8704.	2537.	1055.	1482.	615.	405.	210.
1984	14890.	11638.	2744.	8894.	2626.	1101.	1525.	626.	410.	216.
1985	15336.	11960.	2852.	9108.	2723.	1154.	1570.	652.	430.	222.
1986	15827.	12321.	2973.	9348.	2825.	1209.	1617.	680.	452.	228.
1987	16345.	12703.	3100.	9603.	2933.	1267.	1666.	709.	474.	235.
1988	16909.	13121.	3238.	9883.	3047.	1330.	1717.	740.	498.	242.
1989	17521.	13581.	3391.	10190.	3168.	1396.	1772.	772.	523.	250.
1990	18171.	14070.	3557.	10514.	3295.	1466.	1829.	806.	549.	257.
1991	18861.	14591.	3735.	10856.	3428.	1539.	1889.	842.	576.	266.
1992	19586.	15139.	3921.	11218.	3568.	1616.	1951.	879.	605.	274.
1993	20348.	15715.	4118.	11598.	3714.	1697.	2017.	918.	635.	283.
1994	21151.	16323.	4323.	11999.	3869.	1782.	2087.	960.	667.	293.
1995	21997.	16964.	4540.	12424.	4030.	1871.	2159.	1003.	700.	303.

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APPENDIX B, Cont'd.

Estimated Revenue Losses, By Industrial Category and
Class of Depreciable Asset, 1971-1995

II. 20 Percent Initial Allowance

(Million of Dollars)

		Non-Manufacturing			Manufacturing			Farming		
Year	Total	Total	Equipment	Structures	Total	Equipment	Structure	Total	Equipment	Structure
1971	10500.	7761.	4019.	3742.	2140.	1552.	588.	599.	516.	83.
1972	9558.	7092.	3342.	3750.	1914.	1319.	594.	552.	468.	84.
1973	8852.	6601.	2834.	3767.	1745.	1144.	601.	506.	420.	85.
1974	8325.	6238.	2445.	3792.	1618.	1008.	610.	470.	383.	87.
1975	7932.	5977.	2152.	3825.	1516.	897.	619.	438.	351.	88.
1976	7565.	5729.	1852.	3857.	1425.	795.	630.	411.	321.	89.
1977	7281.	5533.	1617.	3916.	1364.	722.	642.	384.	293.	91.
1978	7125.	5440.	1468.	3972.	1328.	673.	655.	357.	264.	93.
1979	7057.	5425.	1390.	4035.	1298.	629.	669.	334.	239.	95.
1980	7040.	5450.	1345.	4105.	1272.	587.	685.	318.	221.	97.
1981	7057.	5493.	1311.	4181.	1253.	551.	702.	311.	211.	100.
1982	7123.	5566.	1303.	4264.	1247.	526.	721.	309.	207.	102.
1983	7258.	5682.	1330.	4352.	1269.	527.	741.	308.	203.	105.
1984	7495.	5819.	1372.	4447.	1313.	551.	762.	313.	205.	108.
1985	7768.	5980.	1426.	4554.	1362.	577.	785.	326.	215.	111.
1986	7913.	6161.	1487.	4674.	1413.	604.	808.	340.	226.	114.
1987	8173.	6352.	1550.	4801.	1467.	634.	833.	355.	237.	118.
1988	8454.	6561.	1619.	4941.	1524.	665.	859.	370.	249.	121.
1989	8760.	6790.	1695.	5095.	1584.	698.	886.	386.	261.	125.
1990	9086.	7035.	1778.	5257.	1647.	733.	914.	403.	274.	129.
1991	9430.	7296.	1867.	5428.	1714.	770.	944.	421.	288.	133.
1992	9793.	7570.	1961.	5609.	1784.	808.	976.	440.	302.	137.
1993	10174.	7858.	2059.	5799.	1857.	849.	1009.	459.	318.	142.
1994	10576.	8161.	2162.	6000.	1934.	891.	1043.	480.	333.	146.
1995	10999.	8482.	2270.	6212.	2015.	935.	1080.	502.	350.	151.

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Estimated Revenue Losses, By Industrial Category and Class of Depreciable Asset, 1971-1995

III. 40 Percent Shorter Lives

(Million of Dollars)

Year	Total	Non-Manufacturing			Manufacturing			Farming		
		Total	Equipment	Structures	Total	Equipment	Structure	Total	Equipment	Structure
1971	2284.	1592.	1286.	306.	546.	507.	40.	145.	139.	6.
1972	6022.	4238.	3343.	895.	1396.	1278.	118.	388.	371.	17.
1973	8258.	5829.	4384.	1444.	1871.	1679.	192.	558.	530.	28.
1974	10028.	7128.	5167.	1961.	2213.	1949.	263.	688.	649.	39.
1975	11224.	7996.	5533.	2463.	2400.	2068.	332.	828.	779.	49.
1976	11261.	7884.	4920.	2964.	2460.	2061.	399.	917.	858.	59.
1977	11238.	7746.	4281.	3466.	2584.	2120.	464.	908.	839.	69.
1978	11288.	7851.	3867.	3984.	2575.	2048.	527.	862.	783.	79.
1979	11092.	7941.	3473.	4468.	2374.	1782.	593.	776.	686.	90.
1980	10940.	8087.	3165.	4922.	2180.	1514.	665.	674.	572.	102.
1981	10865.	8237.	2884.	5353.	2015.	1270.	744.	614.	500.	114.
1982	10923.	8439.	2682.	5757.	1907.	1077.	830.	577.	450.	128.
1983	11268.	8801.	2626.	6175.	1927.	1003.	923.	540.	398.	142.
1984	11846.	9248.	2636.	6612.	2060.	1039.	1021.	538.	380.	157.
1985	12573.	9793.	2695.	7099.	2208.	1084.	1124.	571.	398.	173.
1986	13382.	10411.	2775.	7635.	2364.	1131.	1232.	607.	417.	190.
1987	14153.	10978.	2860.	8118.	2529.	1184.	1346.	645.	438.	207.
1988	14855.	11464.	2962.	8502.	2706.	1241.	1465.	685.	459.	226.
1989	15575.	11956.	3086.	8870.	2892.	1302.	1590.	728.	482.	245.
1990	16352.	12492.	3231.	9260.	3088.	1367.	1721.	772.	506.	266.
1991	17173.	13070.	3393.	9677.	3294.	1435.	1859.	809.	532.	277.
1992	17897.	13614.	3562.	10051.	3446.	1507.	1939.	838.	558.	279.
1993	18525.	14118.	3741.	10377.	3539.	1582.	1957.	868.	586.	282.
1994	19191.	14654.	3928.	10727.	3637.	1661.	1976.	900.	616.	284.
1995	19805.	15132.	4124.	11008.	3740.	1744.	1995.	933.	646.	286.

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APPENDIX B, Cont'd.

Estimated Revenue Losses, By Industrial Category and
Class of Depreciable Asset, 1971-1995

IV. 20 Percent Shorter Lives

(Million of Dollars)

Year	Total	Non-Manufacturing			Manufacturing			Farming	
		Total	Equipment	Structures	Total	Equipment	Structure	Total	Equipment	Structure
1971	884.	620.	506.	114.	208.	186.	15.	63.	61.	2.
1972	2409.	1713.	1376.	337.	525.	480.	44.	172.	165.	6.
1973	3278.	2305.	1756.	548.	720.	648.	73.	253.	242.	11.
1974	3837.	2674.	1923.	751.	846.	745.	101.	317.	302.	15.
1975	4658.	3285.	2339.	946.	998.	870.	128.	375.	356.	19.
1976	5100.	3641.	2499.	1141.	1016.	862.	154.	443.	421.	23.
1977	5017.	3525.	2187.	1339.	1001.	820.	181.	491.	464.	27.
1978	4954.	3383.	1846.	1537.	1082.	875.	207.	489.	458.	31.
1979	5144.	3545.	1804.	1741.	1149.	917.	232.	450.	416.	35.
1980	5317.	3733.	1776.	1957.	1162.	904.	258.	422.	384.	39.
1981	5181.	3741.	1558.	2183.	1048.	764.	284.	392.	350.	43.
1982	4943.	3736.	1356.	2379.	866.	551.	315.	341.	294.	48.
1983	4944.	3845.	1300.	2545.	810.	460.	350.	288.	235.	53.
1984	5158.	4030.	1311.	2719.	860.	474.	387.	269.	210.	59.
1985	5448.	4247.	1348.	2899.	917.	492.	426.	284.	219.	65.
1986	5736.	4460.	1373.	3087.	976.	510.	466.	301.	230.	71.
1987	6026.	4668.	1387.	3280.	1040.	531.	509.	318.	241.	77.
1988	6370.	4924.	1415.	3509.	1110.	555.	554.	337.	252.	84.
1989	6773.	5233.	1462.	3771.	1184.	582.	601.	356.	265.	92.
1990	7208.	5568.	1526.	4042.	1262.	611.	651.	377.	278.	99.
1991	7679.	5935.	1603.	4333.	1345.	642.	703.	399.	292.	107.
1992	8113.	6259.	1683.	4577.	1432.	674.	758.	422.	307.	115.
1993	8450.	6481.	1767.	4714.	1523.	708.	815.	446.	322.	124.
1994	8758.	6668.	1855.	4813.	1619.	743.	876.	472.	338.	133.
1995	9089.	6872.	1948.	4924.	1719.	780.	939.	498.	355.	143.

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APPENDIX B, Cont'd.

Estimated Revenue Losses, By Industrial Category and Class of Depreciable Asset, 1971-1995

V. 300 Percent Declining Balance

(Million of Dollars)

Year	Total	Non-Manufacturing			Manufacturing			Farming		
		Total	Equipment	Structures	Total	Equipment	Structure	Total	Equipment	Structure
1971	1657.	1144.	848.	295.	433.	382.	51.	81.	75.	6.
1972	4064.	2782.	1933.	849.	1073.	924.	148.	209.	191.	17.
1973	5197.	3533.	2198.	1335.	1382.	1143.	239.	282.	253.	28.
1974	5755.	3905.	2141.	1765.	1529.	1207.	322.	320.	283.	38.
1975	6040.	4126.	1978.	2147.	1576.	1176.	400.	339.	292.	47.
1976	6100.	4206.	1715.	2492.	1550.	1078.	472.	343.	288.	55.
1977	6112.	4245.	1445.	2800.	1536.	996.	540.	331.	268.	63.
1978	6183.	4345.	1268.	3077.	1530.	925.	604.	308.	238.	70.
1979	6262.	4485.	1160.	3325.	1495.	830.	665.	283.	205.	77.
1980	6346.	4634.	1084.	3550.	1450.	727.	723.	262.	178.	84.
1981	6433.	4768.	1016.	3752.	1414.	635.	779.	252.	161.	90.
1982	6555.	4911.	977.	3934.	1398.	565.	833.	247.	150.	97.
1983	6749.	5078.	979.	4098.	1429.	543.	886.	242.	139.	103.
1984	6992.	5246.	999.	4248.	1500.	564.	936.	245.	137.	108.
1985	7256.	5427.	1031.	4396.	1572.	590.	982.	256.	143.	113.
1986	7525.	5614.	1069.	4545.	1643.	617.	1026.	268.	150.	118.
1987	7786.	5793.	1110.	4683.	1713.	646.	1067.	280.	158.	122.
1988	8054.	5978.	1155.	4823.	1784.	678.	1106.	292.	166.	127.
1989	8332.	6174.	1207.	4967.	1854.	711.	1143.	304.	174.	130.
1990	8614.	6373.	1266.	5108.	1924.	747.	1178.	317.	183.	134.
1991	8903.	6579.	1329.	5250.	1995.	784.	1211.	329.	192.	138.
1992	9196.	6787.	1395.	5392.	2066.	823.	1243.	342.	201.	141.
1993	9491.	6997.	1465.	5532.	2138.	865.	1274.	355.	211.	144.
1994	9792.	7211.	1538.	5673.	2211.	908.	1304.	369.	222.	147.
1995	10101.	7432.	1615.	5816.	2286.	953.	1333.	383.	233.	150.

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Estimated Revenue Losses, By Industrial Category and Class of Depreciable Asset, 1971-1995

VI. Full-year Convention

(Million of Dollars)

Year	Total	Non-Manufacturing			Manufacturing			Farming		
		Total	Equipment	Structures	Total	Equipment	Structure	Total	Equipment	Structures
1971	4136.	2982.	2525.	457.	937.	877.	60.	217.	209.	8.
1972	3827.	2452.	1992.	459.	777.	717.	61.	198.	190.	8.
1973	3313.	2250.	1787.	463.	680.	618.	62.	184.	175.	9.
1974	2948.	1879.	1406.	468.	600.	538.	63.	174.	165.	9.
1975	2635.	1884.	1409.	475.	584.	520.	64.	167.	158.	9.
1976	2676.	1929.	1445.	484.	579.	514.	65.	168.	159.	9.
1977	2394.	1747.	1251.	496.	474.	407.	67.	173.	163.	9.
1978	2212.	1543.	1033.	510.	489.	420.	68.	180.	171.	10.
1979	2140.	1489.	963.	526.	485.	415.	70.	166.	156.	10.
1980	2150.	1491.	947.	544.	507.	435.	72.	152.	141.	10.
1981	2183.	1558.	993.	565.	491.	416.	74.	134.	123.	11.
1982	2117.	1492.	904.	588.	486.	409.	77.	139.	128.	11.
1983	2072.	1521.	908.	613.	406.	326.	80.	145.	134.	12.
1984	2089.	1564.	925.	639.	418.	334.	84.	117.	105.	12.
1985	2148.	1587.	952.	636.	439.	351.	88.	122.	109.	13.
1986	2252.	1664.	999.	665.	461.	368.	93.	128.	115.	13.
1987	2360.	1744.	1049.	695.	481.	384.	97.	134.	120.	14.
1988	2436.	1790.	1089.	701.	506.	403.	102.	141.	126.	15.
1989	2548.	1871.	1138.	733.	530.	423.	107.	148.	132.	15.
1990	2664.	1953.	1186.	767.	556.	444.	112.	155.	139.	16.
1991	2793.	2046.	1245.	801.	584.	466.	118.	163.	146.	17.
1992	2933.	2148.	1307.	841.	613.	489.	124.	171.	153.	18.
1993	3079.	2256.	1373.	883.	644.	514.	130.	180.	161.	19.
1994	3226.	2361.	1441.	920.	676.	539.	137.	189.	169.	20.
1995	3387.	2479.	1513.	966.	710.	566.	143.	198.	177.	21.

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Office of Tax Analysis

May 25, 1970

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